

## ANTI OIL LEAKAGE DEVICE FOR A MOTOR SHAFT

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention:

The present invention is related to an anti oil leakage device for a motor shaft and especially to a leakage resistant structure of a fan motor shaft.

#### 2. Brief Description of Related Art:

Referring to Fig. 1, the conventional anti oil leakage for a fan includes a fan frame 11 and fan blade wheel 12. The fan frame 11 further includes a hub 111, which has a hollow bearing seat 112, and the bearing seat 112 fits at the outer side thereof with a stator 13 and receives at the inner side thereof a retaining ring 15, a bearing 16 and an O-ring 17. The fan blade wheel 12 has a hub 121 and fan blades 122. The hub 121 receives a rotor 18 and is provided with a shaft 123 at the center thereof to pierce the O-ring 17, the bearing 16, the retaining ring 15 successively so that the fan blade wheel 12 can be pivotally joined to the fan frame 11 in the hub 111 and the lubrication oil can be prevented from leaking out due to O-ring 17.

A problem of the preceding conventional anti leakage structure resides in that the O-ring is made with inconsistent tolerances, which result in excessive large clearance between the shaft 123 and the O-ring 17, so that the lubrication oil leaks out through the clearance.

Further, Taiwan Utility Model Publication No. 365482, which is entitled "ANTI OIL LEAKAGE DEVICE FOR A MOTOR SHAFT", discloses a main body with a locating seat and a hollow bearing sleeve projects from the locating seat. The bearing sleeve provides inside thereof a self-lubrication bearing and outside thereof a coil and a circuit board. A blade seat provides at the inner side thereof a magnet and provides at the periphery thereof blades. A shaft is disposed in the blade base to pierce through the self-lubrication bearing. The rear side of the

bearing sleeve fits with a covering tightly and the front side of the bearing seat has an end plate with an inner bent hook end. The lubrication oil released from the self-lubrication bearing can be resisted from leaking out with the end plate and the hook end effectively. Further, an oil reservation ring, which is disposed near the hook end, is provided on the shaft to prevent the lubrication oil coming from the self lubrication bearing from flowing outward along the shaft. In addition, an oil storage groove with fiber coil is formed between the self lubrication bearing and the end plate so that the oil released from the self lubrication bearing can be reserved and soaked in the fiber coil to implement oil reservation such that it is capable of prolong the life span of the motor.

However, a problem of the preceding prior art is that it is high for the production cost and it is not high or the perfection rate due to the hook end having to be made. Next, the oil reservation ring on the shaft not only increases the production cost and fabrication process but also increases the friction force, which results from the oil reservation ring moving upward to frictionally contact with the hook end, while the oil reservation ring rotates with the shaft rotates such that the motor may run ineffectively to lower the life span thereof. Furthermore, the oil accumulation space, which is located at the upper end of the shaft sleeve, is very easy to occur oil leakage during the shaft rotating.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide an anti oil leakage for a motor shaft, in which an untouched minimum clearance is formed between a projection part at the upper end of the bearing seat and the shaft, so that the lubrication oil is not admitted to pass the minimum clearance so as to prevent the lubrication oil from leaking out.

Another object of the present invention is to provide an anti oil

leakage device for a motor shaft, in which a stop piece is used for fitting with the opening of the bearing seat tightly and an untouched minimum clearance can be formed between the stop piece and the shaft, so that the lubrication oil is not admitted to pass the minimum clearance so that the lubrication oil can be prevented from leaking out.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The detail structure, the applied principle, the function and the effectiveness of the present invention can be more fully understood with reference to the following description and accompanying drawings, in which:

Fig. 1 is a sectional view illustrating the bearing device of a conventional motor;

Fig. 2 is an exploded perspective view of the first preferred embodiment according to the present invention;

Fig. 3 is a disassembled sectional view of the first embodiment shown in Fig. 2;

Fig. 4 is an assembled sectional view of the first embodiment shown in Fig. 3;

Fig. 5 is a disassembled sectional view of the second preferred embodiment according to the present invention; and

Fig. 6 is an assembled sectional view of the second embodiment shown in Fig. 6.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 2, 3 and 4, the first embodiment according to the present invention at least includes a fan frame 21 and a fan blade wheel 22. The fan frame 21 at least includes a motor base 211 with a bearing seat 212, which is integral with the motor base 211. The bearing seat 212 at the upper end thereof provides a projection 2121 along the axial direction thereof and the lower end thereof is an open end 2122.

The stator 23 fits with the bearing seat 212 and surrounds the outer surface of the bearing seat 212. A bearing 24, a retaining ring 25 and a durable pad 26 are placed in the bearing seat 212 via the lower end 2122 and a sealing plug 27 is tightly joined to the lower end 2122. The fan blade wheel 22 has a hub 221 and a plurality of fan blades 222 extending from the periphery of the hub 221. The hub 221 has at the inner side thereof a rotor 28 and a shaft 29 and the shaft 29 provides an annual recess 291.

Further, the sealing plug 27 is provided with an inner groove 272 and an outer annual recess 2711. An elastic ring 273 fits with the outer annual recess 2711. Once the sealing plug 27 engages with the lower open end 2122 of the bearing seat, the elastic ring 273 can be disposed between the inner wall of the bearing seat 212 and the outer surface of the sealing plug 27 with no clearance in between. Hence, the sealing plug 27 is capable of covering the lower open end 2122 tightly such that the inner groove 272 is formed as an oil storage zone at the lower open end 2122.

During assembling the fan frame 21 and the fan blade wheel 22, the shaft 29 pierces the projection part 2121 at the upper end of the bearing seat 212 and then passes through both the bearing 24 and the retaining ring 25 so as to press against the durable pad 26. The fan blade wheel 22 is rotationally connected to the fan frame by way of the retaining ring 25 engaging with the annular recess 291 of the shaft 29 and the rotor 28 can magnetically connect with the stator 23 such that an untouched minimum clearance is formed between the shaft 29 and the end of the projection part 2121.

When the shaft 29 rotates to allow lubrication oil in the inner groove 272 of the sealing plug 27 moving upward along the shaft 29 due to capillarity, the lubrication oil is viscous and the untouched minimum clearance between the shaft 29 and the end of the projection part 2121 is smaller than the molecular structure of the lubrication oil. In this way, the capillarity is broken to resist the lubrication oil from moving

upward and it is capable of preventing the lubrication oil from leaking out. Further, it is possible for the lubrication oil to flow back to the oil storage zone and keep the storage zone being full of oil. Hence, it is able to prolong life spans of the shaft 29 and the bearing 24.

Referring to Figs. 5 and 6, the second embodiment of the present invention are illustrated and it can be seen in Figs. 5 and 6 that the integral structure and function of present embodiment is similar to the first embodiment and the identical parts with the same designated numbers will not be explained again. The difference of the present embodiment from the first embodiment is in that the bearing seat 312 has at the upper end thereof an opening 3121 and forms at the lower part thereof a groove, which is defined as an oil storage zone. A stop piece 37, which engages with the inner side of the opening 3121 tightly, is provided with a through hole 371 for being pierced with the shaft 29 so as to allow the fan blade wheel 22 being connected to the fan frame pivotally. An untouched minimum clearance is formed between the stop piece 37 and the shaft 29 for preventing the lubrication oil in the oil storage zone from leaking out and it is capable of allowing the lubrication oil to flow back to the oil storage zone.

While the invention has been described with referencing to preferred embodiments thereof, it is to be understood that modifications or variations may be easily made without departing from the spirit of this invention, which is defined by the appended claims.